

## The Scientific Revolution

- **Entrance task:** Think: What was going on in Europe during the time of Copernicus (1500s) and Galileo (1600s) that may have contributed to the attitudes toward their new ideas?
- **Today's class:** The Scientific Revolution
- **Homework:** Ch. 16-2

## Things to make you say "hmmm"

### Table Talk Question 1:

Are there any examples of new ideas that have been met with a reaction similar to that of the heliocentric theory?



## The Scientific Revolution & Enlightenment

*16<sup>th</sup> – 18<sup>th</sup> century developments in science, technology, philosophy, music, art and literature.*

## The Scientific Revolution

The beginning of the scientific revolution:

- Copernicus - The Revolution of the Heavenly Bodies
- Vesalius - On the Structure of the Human Body
- Within a century and a half, man's conception of himself and the universe he inhabited was altered

## Ptolemy & the Geocentric Theory



- Early scientific thought was based a great deal of the work of Aristotle and Ptolemy. They believed that the earth was the center of the universe and that the sun and planets revolved around it.

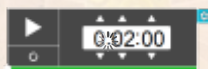
## Copernicus and the Heliocentric Theory

Copernicus believed the opposite was true, and published his findings just prior to his death in 1543.



### Table Talk Question 2:

Why was the heliocentric theory received with such disdain by some?



### Others supported the Copernican theory

Tycho Brahe  
Johannes Kepler  
Galileo Galilei



### Table Talk Question 3:

What did Isaac Newton mean when he said:

"If I have seen further than others, it is by standing on the shoulders of giants."



### Readings: Think about these questions

#### Cardinal Bellermino

- What position does he hold about the position of the sun and earth?
- On what grounds did Cardinal Bellermino reject Copernican theory?
- Do you think he could be persuaded to accept Copernican ideas?

#### Galileo

- How did he feel about biblical authority and science?
- According to him, how did people gather information about nature?

### Reading: Think about these questions

#### Copernicus - Dedication to Pope Paul III

- What fear does Copernicus have about his book?
- What rationale does Copernicus give for publishing this?
- What was his process for developing this theory?
- Why do you think he dedicated it to Pope Paul III?

## Homework Ch. 16-2



## Scientific Thinking in a New Age

Entrance task: Relax

Today: Models for scientific discovery

Homework - Ch. 16-3, finish for Wed.

**General  
Principle**

Deductive Reasoning

**Special  
Case**

Inductive Reasoning

## Scientific Thinking in a New Age

Inductive reasoning

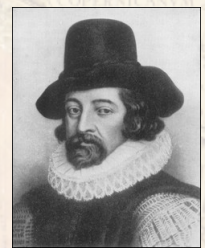
Empiricism

Francis Bacon



### Inductive reasoning

The doctrine that scientists should proceed from the particular to the general by making systematic experiments to test hypothesis or theories, a process that will lead to correct general principles



Francis Bacon



Inductive - from specific to general

Every Social Studies textbook has an index.  
Every Science textbook has an index.  
Every Math textbook has an index.

Therefore all textbooks have an index.

Deductive Reasoning

Descartes



"I think, therefore I am"

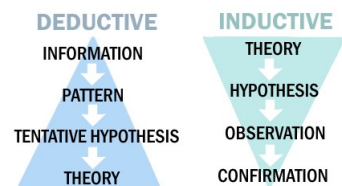
Deductive reasoning is a logical process in which a conclusion is based on the concordance of multiple premises that are generally assumed to be true.

Deductive reasoning is sometimes referred to as top-down logic. Its counterpart, inductive reasoning, is sometimes referred to as bottom-up logic.

Deductive: From general to specific

All textbooks have an index.  
This is a textbook, therefore it has an index.

Conjecture: An educated guess based on given information



**Inductive reasoning:** Uses several examples (pattern) to make a conjecture.


**Deductive reasoning** uses facts or definitions to reach a logical conclusion or conjecture.

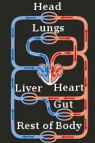
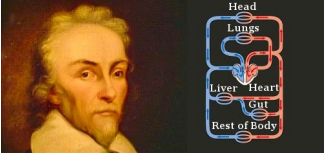
Ch. 16 all.notebook

Inductive Reasoning	Deductive Reasoning
from specifics to general	from general to specific
<b>Examples</b>	
Michelle, Krisna, and Karen are all thin. They are dancers. Therefore, all dancers are thin.	All dancers are thin. Karen is a dancer. Therefore, Karen is thin.
Ms. Mayumi, Mrs. Marikit, and Mr. Mabini are teachers. They are all nice. Therefore, all teachers are nice.	All teachers are nice. Ms. Mayumi is a teacher. Therefore, Ms. Mayumi is nice.
Parrots, eagles, and doves are birds. They can all fly. Therefore, all birds can fly.	All birds can fly. Parrot is a bird. Therefore, parrots can fly.

	Inductive method	Deductive method
Science		
Government		
Society		
	<b>Inductive reasoning</b> Uses several examples (a pattern) to make a conjecture.	<b>Deductive reasoning</b> uses facts or definitions to reach a logical conclusion or conjecture.

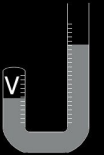

**Andreas Vesalius**  
1514-1564





**William Harvey**  
1578-1657

**Robert Boyle**  
1627-1691



**AP Short Answer Question**

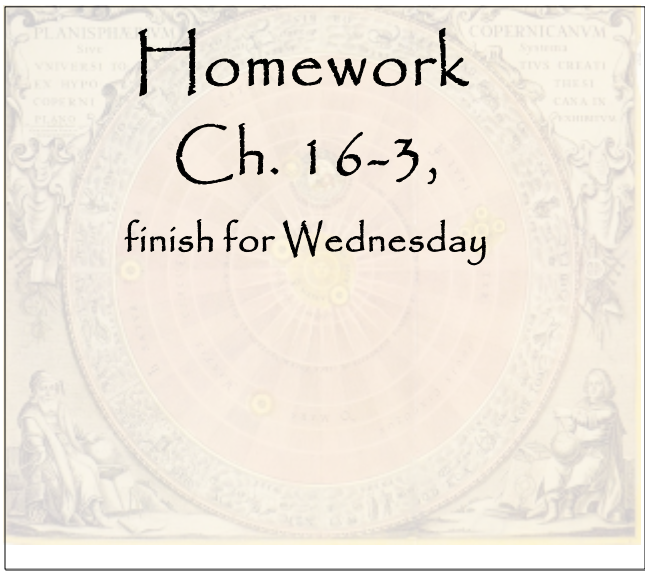
Use the passage below to answer all parts of the question that follows.

“The best way to assess the depth and scope of the Scientific Revolution is to compare and contrast the science that came into fruition in the seventeenth century with its nearest equivalent in the late Middle Ages. . . . Traditionally, knowledge had been based on faith and insight, on reason and revelation. The new science discarded all of these as ways of understanding nature and set up experience—experiment and critical observation—as the foundation and ultimate test of knowledge. The consequences were as revolutionary as the doctrine itself. For not only did the new method found knowledge on a wholly new basis, but it implied that men and women no longer had to believe what was said by eminent authorities; they could put any statement to the test of controlled experience.”

I. Bernard Cohen, historian, *Revolution in Science*, 1985

1. a) Identify TWO specific examples of scientific discovery that support Cohen’s argument and explain how each one supports his argument.

b) Explain ONE way in which the shift in scientific inquiry described by Cohen affected European views of society or politics in the seventeenth and eighteenth centuries.



## The European Enlightenment

Entrance task: What is the relationship between the Scientific Revolution and Enlightenment thinkers?

Today - Enlightenment thinkers and their work

Homework - Finish and review Ch. 16-3

What are some of the common themes of Enlightenment thinkers?

**Nothing should be accepted on faith alone.**

**Like nature, society functions by certain rules.**

**Progress is possible and probable.**



## Ch. 16 all.notebook

1. *What is Enlightenment* (Kant)
2. *On Crimes & Punishment* (Beccaria)
  - \* What do you know about the author? \* What is the main idea of the excerpt?
3. *The Social Contract* (Rousseau)
  - \* How does this reflect the author's main Enlightenment ideas?
4. *Treatise on Toleration* (Voltaire)
  - \* How does this excerpt reflect the general concepts of the Enlightenment era?
5. *Spirit of Laws* (Montesquieu)

Homework - Finish and review Ch. 16-3 Quiz tomorrow?????

### ENLIGHTENMENT THINKERS

ENTRANCE TASK: RELAX!

TODAY: ENLIGHTENMENT THINKERS AND THEIR THOUGHTS

HOMEWORK: CH. 16-4 ENLIGHTENED MONARCHS



### ENLIGHTENMENT THINKERS

1. REVIEW THE LIST OF ENLIGHTENMENT THINKERS ON THE CHART. DISCUSS WHAT **YOU** KNOW ABOUT EACH
2. REVIEW THE STATEMENTS ON EACH OF THE NOTE CARDS & DISCUSS THEIR ORIGIN
3. WRITE THE NUMBER OF THE STATEMENT IN THE SECTION OF THE APPROPRIATE WRITER



Ch. 16 all.notebook

Montesquieu (1689-1755)	<b>7</b> Separation of Powers into three branches <b>16</b> Influenced US government
John Locke (1632-1704)	<b>3</b> - Natural rights - life, liberty, property <b>5</b> - Two Treatises on Government (consent of the governed) <b>8</b> - People can govern themselves. <b>16</b> Influenced US gov.
François Marie Arouet (Voltaire) (1694-1778)	<b>1</b> Enlightened monarch was best gov. <b>4 &amp; 6</b> Wrote 70+ essays, religious toleration, free speech <b>19</b> Organized religion promotes superstition
Jean Jacques Rousseau (1712-1778)	<b>11</b> The <i>general will</i> <b>15</b> Society corrupts - born free, everywhere in chains <b>17</b> Admired the noble savage <b>18</b> Wrote A Social Contract



Denis Diderot (1713-1784)	<b>13</b> Edited <i>The Encyclopedia</i> , knowledge leads to progress
Immanuel Kant (1724-1804)	<b>12</b> What is Enlightenment? <b>14</b> Free expression leads to enlightenment
Madame du Chatelet	<b>10</b> Translated <i>Principia</i> <b>20,22</b> Hosted salons, friends with Voltaire
Cesare Beccaria	<b>2</b> - <i>On Crimes and Punishment</i> , opposed torture and capital punishment. <b>9</b> Punishment should prevent crime, not avenge the offender.



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HOMEWORK: CH. 16-4



## Enlightened Absolutism

Entrance task: Given your expertise on enlightened monarchs, think of one contemporary example of a leader who somewhat fits that definition.

Today: Enlightened Absolutism

Homework: Review Ch. 16



**18th Century Europe**  
brought many new ideas

Enlightenment Thought

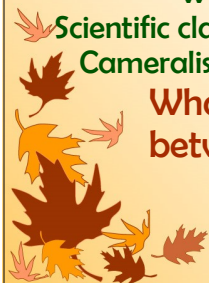
Reading revolution

Women hosting salons

Scientific classification — racism & slavery

Cameralism & Enlightened monarchs

What's the relationship  
between these things?



## Change

From where did most  
Enlightenment thinkers think  
change best originated?





## Quotes from Frederick the Great

\* The greatest and noblest pleasure which men can have in this world is to discover new truths; and the next is to shake off old prejudices.

\* A crown is merely a hat that lets the rain in.

\* He who defends everything defends nothing.



## Frederick II - *The Great*: Essay on Forms of Government

1. What characteristics should an effective ruler possess?
2. According to Frederick the Great, from where does the right to rule originate?
3. What does Frederick the Great see as the responsibilities of a ruler?
4. Based on this information about Frederick the Great, write a definition of an **Enlightened Monarch**.



Video clip - 6:09

### Characteristics of an effective ruler

- \* know the people, resources, and commerce
  - \* honesty, wisdom
- \* good with the people's money
  - \* hardworking
- the First servant of the state
- \* the head to the body (people)

### The source of power?

#### Responsibilities of a ruler?

- \* the judge, general, financier, leader
- \* must act in the best interest of his people

## What is an Enlightened Monarch?

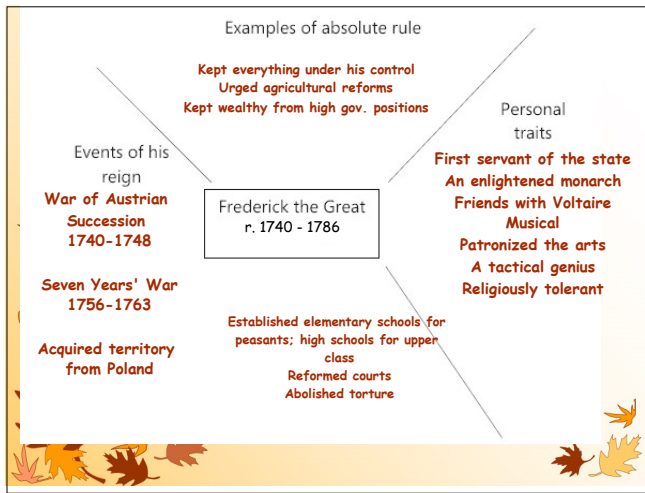
A ruler who puts their country before their beliefs and their needs.

Someone who rules as a man looking out for his country and people, not looking out for just his own benefits.

The essence of a perfect person who rules with his subjects using good manner all for the sake of their country.

A ruler whose first priority is taking care of the people.

A ruler that puts his country and people first and does not believe he rules by divine right and rules responsibly.



## Absolutism in Austria

- Charles VI (r. 1711-1740)
- Pragmatic Sanction
- Maria Theresa (r. 1740-1780)
- Joseph II (r. 1765-1790)



## Enlightened reforms

- Weakened power of the Church and the Pope
- Taxed nobles and reduced their power over peasants
- Joseph later abolished serfdom, allowed Jews into services and trades previously restricted.



Maria Theresa (r. 1740-1780)

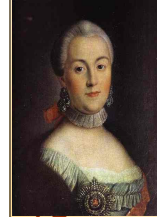


Joseph II (r. 1765-1790)

### Catherine the Great r. 1762-1796



### Catherine the Great r. 1762-1796



- Continued Peter the Great's westernization programs
- Restricted torture
- Some religious toleration
- Improved education
- Empowered local government



### Catherine the Great r. 1762-1796

#### The Pugachev Rebellion, 1773



Reversed her reforms. A bad time for serfs, great time for nobles





Homework: Review Ch. 16

